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EFFECT OF A STATIC NON-UNIFORM MAGNETIC FIELD ON THE SURFACE PROPERTIES OF ACRYLIC RESIN. A. Gasparetto[1], I. Hibler[2], A.J. Palangana[2], C.R. Paula[3], R. Oliveira[4]. [1]Department of Dentistry Universidade Estadual de Maringá, Maringá, Paraná 87080-310 Brazil. [2]Department of Physics, Universidade Estadual de Maringá, Maringá Paraná, 87020-000 Brazil. [3]Department of Microbiology, Universidade de Sao Paulo, Sao Paulo 05508-730 Brazil. [4]Center of Biological Engineering, Universidade do Minho, Braga, 4710-057 Portugal.

INTRODUCTION: The acrylic resin is a polymeric material with several applications in different scientific and technological fields, especially in medicine and biotechnology. Its physical characteristics or their possible modifications can imply new ways of utilization and applicability.
OBJECTIVE: To study the effect of a magnetic field on the surface physico-chemical properties usually implied in bacterial adhesion, especially surface hydrophobicity.
METHODS: the hydrophobicity of the resin surface was determined by sessile drop contact angle measurements, using van Oss (1994) methodology. Accordingly, a substance (i) is considered hydrophobic when the variation of the free energy of interaction between two entities of substance (i) immersed in water is negative ($\Delta G_{iwi}<0$). That is to say, the two entities of substance (i) interact preferentially between them then with water. On the contrary, if $\Delta G_{iwi}>0$, substance (i) is hydrophilic.
Two types of resin samples were used: hydrated and non-hydrated ones. The hydrated samples were obtained by autoclaving at 121ºC. Before contact angle measurements, the samples submitted to the magnetic field were exposed during 24 hours to a field of 500gauss generated between to parallel magnetite plates.
RESULTS AND DISCUSSION: The principal results are summarized in Table 1. As could be expected the hydrated resin is hydrophilic, while the dehydrated is hydrophobic. However, when the hydrated resin is submitted to the magnetic field it becomes even more hydrophobic than when dehydrated. This can be explained by the effect of the magnetic field on the orientation of the water molecules of hydration. Consequently, there is an evident alteration of surface properties promoted by the magnetic field.

Table 1 – Acrylic resin degree of hydrophobicity expressed as $D\mathbf{G_{iwi}}$

Acrylic Resin Condition	$D\mathbf{G_{iwi}}$
dehydrated	-9.232704494
hydrated	0.371220915
hydrated and under magnetic field exposition	-22.06587279

References.

Van Oss, C.J., (1994). Interfacial Forces in Aqueous Media, Marcel Dekker, Inc., New York.

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